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**Paper:** **Vocational Qualifications for the UK explosives industry**

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## **Introduction**

The possible consequences of a lack of competence when working with munitions or explosives can be devastating and the UK has long held concerns over these possibilities. So, the Standards Setting Body for Explosives, Munitions and Search Occupations (SSB for EMSO) was formed in 2000 in order to develop National Occupational Standards<sup>1</sup> and National/Scottish Vocational Qualifications (N/SVQs) for those involved in munition clearance (ie bomb disposal – both EOD and IEDD) and search activities. The standards would provide specific, objective, measurable and nationally agreed statements of competence that could be used in any part of the explosives industry – military, civilian or private sector. These standards were launched in October 2003.

In the autumn of 2003, the Defence Ordnance Safety Group (DOSG) of the Ministry of Defence (MoD) approached the SSB and asked for help in defining the competences known at the time in the MoD as Ordnance, Munitions and Explosives (OME) but which later became known as Explosive Substances and Articles (ESA). Since the MoD ideally wished its personnel to

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<sup>1</sup> Referred to here simply as “standards”

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gain national accreditation for achievement of the resulting standards, the project was therefore widened to include all organizations that employed people who needed expertise in dealing with explosives.

Early in the project, it became clear early in the project that many organizations in different sub-sectors of the industry wished to participate in this project and invitations to collaborate were accepted both at the beginning of the project and continuously, throughout its lifetime. The work was developed by senior representatives of those organizations involved in ESA activities. Its composition therefore varied according to the functional area under development and key participants were: the MoD, Army, Royal Navy, Royal Air Force, Dstl, QinetiQ, AWE, Leaffield Engineering and MBDA.

## **ESA project outputs**

The key outcomes of the project were:

### ***Occupational map***

A descriptive report of the industry, its size and composition; skills and training issues; roles employed; numbers employed and other notable related issues.

### ***Functional map***

This describes all of the explosives-specific functions carried out in the explosives industry and the most common generic functions.

### ***National Occupational Standards***

A suite of around 450 standards (of which around 260 are explosives-specific), describing the measures by which someone's performance would be measured (*performance criteria*), descriptions of the parameters of competent performance (*contexts*) and the critical minimum knowledge and understanding (*knowledge requirements*) needed to fulfil the performance criteria and contexts – all written as outcomes.

### ***Qualifications designs***

24 roles were defined in eleven of the twelve technical (ie explosives-specific) key roles<sup>2</sup>. Other qualifications have been designed subsequently, totalling 35 qualifications designs at

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<sup>2</sup> *ibid* but note also that the standards contained in key role 13 *Generic functions* were used only to combine with explosives-specific standards in other key roles to form qualifications

levels 1 – 4 (effectively, basic support, operator, supervisor/technician and operational manager.

## Drivers to implementing competence measures

Worldwide, the handling of explosives is usually regulated by law, with prescribed procedures, duties, responsibilities and obligations. Until recently, detailed competence statements in this safety critical area have not been defined. There is an increasing amount of interest in the UK in describing and measuring people's competence in all professions, including working with explosives.

Particular drivers include the fact that:

- competence measurement is increasingly the norm in most professions;
- legislation and regulation increasingly require employers to demonstrate a commitment to quality and effectiveness in their workforces;
- activities with significant, or indeed, perceived health and safety and public safety risks are subject to increasingly stringent monitoring and regulation;
- the risk of losses and litigation renders inaction financially and morally unacceptable;
- in the post-Cold War era, the pool of personnel with explosives competence is shrinking in many nations, which makes any way of providing measurable and transferable competence attractive
- an organization's ability to prove the competence of its workforce may confer a competitive advantage commercially and, in certain contexts, may be a pre-requisite for contractual or other reasons (eg if seeking to work collaboratively with national or multinational entities).

In July 2009, the MoD published a requirement to demonstrate competence against the National Occupational Standards (NOS) for Explosive Substances & Articles (ESA), where an article is any equipment containing explosives. This applies to all people working with or responsible for ordnance, munitions and explosives (OME). Specifically, it says:

*The competence of those working in Weapons, Ordnance, Munitions or Explosives (WOME) shall be demonstrated against the standards of best practice set by the sector; these are the*

*National Occupational Standards (NOS) for Explosives Substances and Articles (ESA).*

The Health and Safety Executive (HSE) has also stated that, when carrying out inspections or investigating incidents as the regulatory authority, it plans to review the competence of personnel against the ESA standards. We anticipate that proof of competence when working with explosives will become increasingly important in the UK. This can be done by working to standards.

Standards lie at the heart of all HR processes. There are in fact many possible uses of standards in a range of HR processes as described by the diagram below.

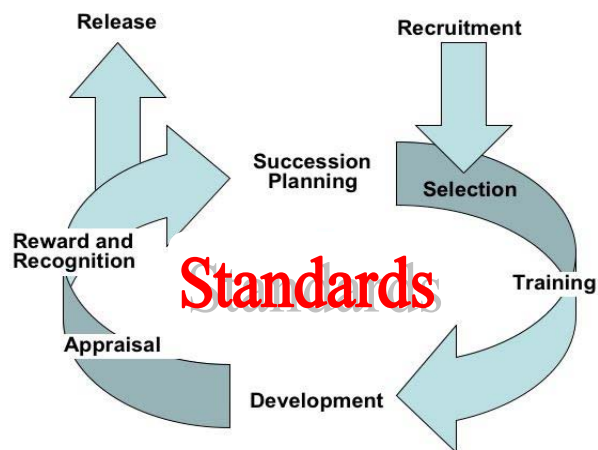


Diagram 1

By describing what an organization expects of its staff, standards can be used for many different purposes such as:

- recruitment and selection - eg job adverts, interview aide memoires, job descriptions, role profiles;
- appraisal – standards amplify an organization's expectations; appraisals can be more objective & evidence-based;
- training needs analysis – through self-assessment, development discussions, 360° feedback, Personal Development Plans, audits of team strengths & development needs;
- training syllabus design – based on the requirements of the standards;
- career management – eg career maps, career planning tools;
- succession planning – systematic approaches to talent management based on an organization's analysis of development needs;

- demonstration of a commitment to known quality standards, investment in people and the ability to comply with legislation, regulation and codes of practice;
- business continuity planning - systematic approaches to talent management development based on an organization's analysis of contingency mitigation;

... and many more specific applications within each part of the HR cycle.

## **Developments in explosives vocational qualifications to date**

### ***Vocational qualifications***

We have completed a number of projects that extend the range of explosives-related vocational qualifications. We have developed:

- three qualifications designs for those who work with explosives in the entertainment industry, specifically those who give fireworks displays or work as special effects technicians and armourers in film, TV and theatre and members of re-enactment societies;
- another competence-based vocational qualification in Explosives Safety Management for additional job roles.

The additional standards in Explosives Safety Management recognize the contribution of other specialist explosives safety functions than the standards that we had already defined. Police Explosives Liaison Officers were also involved in this work for the first time. These standards are currently in the process of being nationally accredited.

### ***Qualifications and Credit Framework (QCF)***

The existing UK national qualifications framework is being replaced by the QCF which is scheduled to come into force in January 2011. We have developed "new style" QCF qualifications for two different communities:

- those who transport explosives but who are not required to hold an ADR licence;
- those who manage the safety of defence ranges (this work is therefore applicable to managing safety on defence training ranges and trials, evaluation, research and proofing ranges).

The components of QCF qualifications are known as *units of assessment*. The units can accredit knowledge, competence or a combination of both. They are written as learning outcomes

and assessment criteria – ie their format is completely different from the current system. The units each have a level which is constant and they bear credit values which are based on learning time (1 credit = 10 hours learning time).

The units are all entered onto a national database which you can find at: [www.accreditedqualifications.org.uk](http://www.accreditedqualifications.org.uk). The units must be accompanied by Rules of Combination (RoC) which specify how credit from the units achieved may count towards a qualification. Qualifications are described by their size – Award (1 – 12 Credits); Certificates (13 – 36 Credits) and Diplomas (37 credits +). There are 9 levels within the QCF. Thus, there can be an Award, Certificate and Diploma at any or all levels from Entry level to level 8. For full details of how all UK qualifications fit together, please see <http://www.ofqual.gov.uk/2368.aspx>. For a quick reference of the different levels within the QCF, see diagram 2 below.



Diagram 2

A radical innovation is that for the first time, employers can become awarding bodies in their own right, designing and awarding their own qualifications. Those that have gone down this route in the UK include Ministry of Defence, the airline Flybe, Network Rail and the UK division of global restaurant chain McDonalds.

## Homeland Security Qualifications' explosives qualifications

Homeland Security Qualifications has been recognized by the UK explosives sector as an industry-recognized awarding body and offers 3 different types of vocational qualification (VQ):

- VQs that are compliant with the new QCF;
- VQs based on existing nationally accredited ESA NOS – qualifications exist between levels 1 (basic support) and level 4 (operational management) (there are 5 levels in the national framework);
- bespoke qualifications – which are probably recognized by most as externally recognized company training.

### ***Explosives Substances and Articles Vocational Qualifications (ESA VQs)***

The ESA VQs comprise a number of NOS and are written in terms of the competence needed for a particular function which is measured by achieving the performance criteria; specifications of the critical minimum knowledge and understanding needed to fulfil the performance criteria and descriptions of the parameters of competent performance – the “contexts”.

They involve an occupationally competent, qualified assessor to assess the candidate and require internal and external verification of assessment processes. VQ evidence must be current, valid, complete, authentic, sufficient and reliable, and is obtained by:

- direct observation of the candidate;
- photographic, audio, video or other electronic recording of candidate activity;
- the presentation of work produced by the candidate;
- previous recorded achievement;
- questioning the candidate to assess underpinning knowledge and understanding and/or to authenticate the validity of other evidence.

### ***Bespoke qualifications***

Unlike NVQs and QCF qualifications, bespoke qualifications are not part of a national framework and cannot be used to secure public funding or exemption from, say, college entrance requirements. However, for some employers and groups of employers, such awards are a useful tool for the selection, training and advancement of personnel and, where employers are in a collaborative community, may have credibility amongst them all, providing transferable skills records.

Bespoke qualifications may be linked to NOS or national qualifications and are likely to recognize approved in-house training, role profile matching or other records of experience, skills and knowledge in employment.



## Defence Science & Technology Laboratory (Dstl): a case study

Dstl was quick to see the value of the ESA NOS and made a significant contribution to the ESA project in terms of the time to attend meetings and read documents, participating in the validation phase, providing accommodation for workshops and significant funding.

Since the launch of the ESA NOS, Dstl has been embedding them in its HR processes (diagram 1) so that employees can be recruited, trained, developed, appraised and managed against the ESA NOS. This is helping Dstl to identify in detail its corporate explosives training needs, commission training that meets these specific requirements and to target its training resources more effectively. Over the years, the use of the ESA NOS is expected to provide a base for improved career management and manpower planning arrangements.

To date, Dstl has:

- developed an Explosives Capability Strategy which sets out its expectations and entitlements for explosives workers from the most junior level up to the Group Leaders. This strategy describes linkages with academic and practical training and the career development that explosives workers might expect in order to achieve their career ambitions whilst simultaneously providing Dstl with a systematic succession planning process;
- appointed a VQ Co-ordinator to take forward this work;
- created role profiles for all roles involved in the use of explosives and mapped them to ESA NOS, available training and relevant qualifications (the role profiles are now embedded in Dstl's appraisal process). Note: the Trials Conducting Officer role profile is recognized by QinetiQ and others as effectively the same as in their organizations ie a definition of a common language and commonly agreed description of functional competence is beginning to emerge – and this will probably be recognized across the world;
- run a pilot which tested the introduction of the ESA NOS & helped to rationalize the numbers of explosives role profiles;
- developed portfolios during the pilot which provide proof of competence to the regulator when authorizing people to work in an explosives occupational area (including ranges);
- mapped internally and externally delivered training courses to the ESA NOS so some of the knowledge and

competence required by the ESA NOS can be achieved via training;

- trained key staff in assessment and internal verification skills (ie internal quality assurance);
- analysed the gaps in competence and training of individual, named role holders and drawn up a training plan, listing individuals by name;
- achieved centre approval status from Homeland Security Qualifications;
- achieved approval from HSQ to run the following 11 qualifications schemes:
  - L4 Dstl Trials Conducting Officer - bespoke;
  - L4 Dstl Lead Explosives Research Scientist - bespoke;
  - L4 Dstl Trials Manager (Explosives) - bespoke;
  - L4 Dstl Forensic Case Officer (Explosives) – bespoke;
  - L4 Dstl Assessor of Competence in Using Explosive Substances & Articles - bespoke;
  - L4 Dstl Internal Verifier of Assessment of Competence in Using Explosive Substances and Articles – bespoke;
  - L3 Dstl Explosives Trials and Research Team Member - bespoke
  - L3 Dstl Explosives Research Scientist – bespoke
  - L4 Defence Range Safety Diploma;
  - L2 Award in the Vehicular Movement of Explosives);
  - Competence in Explosive Substance and Article (VQ Units only);
- registered 26 candidates for the above qualifications. Also, 3 people have been registered to achieve 3 units each because these are specifically relevant to their specialized roles.

Not content with such significant achievements over such a short space of time, Dstl has already begun to extend this work to cover other explosives roles. Role profiles and assessment portfolios are being developed and ESA qualifications are in the

process of being implemented. This means that Dstl management will gain the assurance that its explosives workforce is competent and an objective system will be in place against which new starters can be trained and developed. This should lead to improved retention and enhanced business performance.

Proof of competence is a priority to Dstl and can be achieved by the delivery of externally verified qualifications. So, it is likely that more assessors will be trained to cope with the extra demand caused by the roll-out of qualifications.

Dstl has also been at the forefront of new developments in qualifications by leading on and participating in projects to develop units of assessment and qualifications based on them that are compliant with the emerging Qualifications and Credit Framework (QCF) due to replace the current system by 1 January 2011. It has sponsored the development of the Defence Range Safety and Movement of Explosives qualifications and plans to continue supporting the development of other, QCF-compliant qualifications.

## **Latest developments for HSQ**

We are in the process of achieving UK government approval as a nationally recognized awarding body through our partnering arrangement with the Institute of Commercial Management ([www.icm.ac.uk](http://www.icm.ac.uk)) – a global professional and accreditation body that has been established for some 30 years. This means that we should soon be able to offer nationally accredited qualifications in explosives- and search-related disciplines which will also be endorsed by the Institute of Explosives Engineers.

Recently, we have been approached by other organizations – QinetiQ, Ramora UK and SPEX Speciality Explosives Services - who all want to work with the standards to deliver training and competence both internally and to the UK explosives industry.

## **Summary**

In summary, there are many significant benefits to measuring people against objective and detailed descriptions of competence. The use of standards and the achievement of explosives qualifications not only provides proof of competence but, if embedded in HR systems, provides organizations with systematic processes for capacity-building (both knowledge and competence) and the better targeting of resources, quality enhancement, risk avoidance, collaborative working and gaining a competitive edge.

Homeland Security Qualifications has started delivering explosives-related vocational qualifications in the UK. We have started to expand the range of our offering and our client base, both at home and abroad.

We have already seen the cross-industry recognition of common roles and the UK explosives industry has recognized Homeland Security Qualifications so that people moving between employers will be recognized as competent if they have achieved an explosives qualification from HSQ. Whether we like it or not, UK regulators are taking an increasing interest in the explosives area to the point of insisting on proof that organizational policies meet competence requirements in the best interest of employees, public health and safety, environmental protection, economic growth and the taxpayer and we expect this trend to develop worldwide.

Denise Clarke

18 June 2010

# Homeland Security Qualifications



Vocational Qualifications for the  
UK Explosives Industry  
Denise Clarke  
DDESB  
Portland, Oregon, USA  
13 – 15 July 2010

# Introduction

Worldwide, explosives handling regulated by law  
Prescribed:

- Procedures
- Duties
- Responsibilities
- Obligations

“Competence” not defined till ESA NOS developed

# Standards



# ESA Standards and qualifications

ESA VQs cover:

Research, design & development

Test & evaluation

Maintenance

Storage

Facilities management

Disposal

Generic

Safety management

Manufacture

Procurement

Transport

Entertainment

Munition clearance & search



# What are Standards?



- Performance Criteria
- Underpinning knowledge and understanding
- Contexts

# Summary of work (1)



2000 - SSB for EMSO established

2002 – NOS & qualifications in Munition clearance and search completed

2003/6 - 260 NOS and 31 competence-based VQs developed

2007 - Review & revision of Munition clearance and search NOS & extra NOS & search VQ

## Summary of work to date (2)



2008:

- Additional NOS and VQs in explosives safety management
- Additional NOS and VQ designs for the use of explosives in entertainment
- New-style VQs in the transport of explosives
- New-style VQs in the management of safety on defence ranges

## Summary of work to date (3)



2009 - 2010:

- Dstl centre and scheme approval
- 3 more organizations registering
- Munition clearance and search priorities
- Defence Range Safety
- Movement of Explosives
- Institute of Commercial Management

# QCF qualifications



- Units of Assessment (competence/knowledge)
- Level
- Credit values
- Rules of Combination
- Awards, Certificates & Diplomas
- Can be employer-designed

## HSQ's explosives qualifications

3 types of vocational qualification:

- 'New-style' Qualifications & Credit Framework (QCF) Awards, Certificates and Diplomas at 4 levels
- 'Old-style' Vocational Qualification (VQ) at 4 levels
- 'Bespoke' qualifications

## HSQ ESA VQs



- Based on ESA NOS (competence, knowledge, contexts)
- Occupationally competent, qualified assessors
- Internal and external verification
- Evidence must be current, valid, complete, authentic, sufficient:
  - Observation
  - Witness testimony
  - Photos & recordings
  - Records of candidate's own work
  - Previously recorded achievement
  - Questioning

# Bespoke qualifications



- Employer designed
- Accredit:
  - Competence
  - Training



## Dstl : a case study

- Explosives Capability Strategy developed and coordination planned
- Training and job roles mapped to ESA NOS
- Registration with HSQ as an assessment centre
- Bespoke/tailored qualifications agreed with HSQ
- Assessors trained
- Pilot scheme
- First HSQ scheme approvals
- First candidates registered with HSQ

## **Dstl : next steps**

- Roll out ESA NOS
- Train more assessors and internal verifiers
- Develop QCF qualifications
- Deliver QCF qualifications

## Defining and measuring competence

- Assurance of competence in a safety-critical area
- Systematic development of people:
  - Competence
  - Knowledge
- Mobility of labour, long-term organizational skills development
- Achievement of explosives qualifications

# Homeland Security Qualifications



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